CLAIMS

What is claimed is:

1. A method for automatically assigning a network address to a first network node

5   attached to a packet communication network, the method comprising the steps of:

    communicating with at least one other network node to collect information

    from inter-node communication packets containing network address information

    other than an address assignment to the first network node;

    determining an available network address based on the collected network

10 address information contained in the collected inter-node communication packets;

    and

    applying the available network address to the first network node.

2. The method according to Claim 1, wherein the step of determining includes, in the

    first network node, building lists including:

15 network addresses determined to be on the network; and

    network addresses included in the inter-node communication packets but

    not determined to be on the network.

3. The method according to Claim 2, wherein the step of determining includes

    copying network addresses stored in the lists from a list including undetermined

20 network addresses to a list including determined network addresses as a result of

    observing the network addresses in ARP request messages in the communication

    packets.

4.   The method according to Claim 1, wherein the step of determining includes issuing ICMP requests as general broadcast requests and local subnet broadcast requests.

5.   The method according to Claim 1, wherein:
            the first network node is coupled to a subnet; and
            the step of determining includes finding one assigned IP address on the subnet to which the first network node is coupled.

6.   The method according to Claim 5, wherein the step of finding includes, posing as a node having an IP address external from the subnet on which the first network node is coupled, contacting nodes having IP addresses extracted from information parsed out of the information packets.

7.   The method according to Claim 6 wherein the extracted IP addresses are stored in lists organized into at least one list having undetermined device addresses and at least one list having determined node addresses.

8.   The method according to Claim 7 wherein the node addresses include unique physical layer addresses and IP layer addresses.

9.   The method according to Claim 6, wherein contacting nodes is performed using ARP requests.

10.   The method according to Claim 6 wherein contacting nodes is performed using ICMP requests.

11.   The method according to Claim 6 wherein contacting nodes is performed using a combination of ARP and ICMP communication packets.

12.   The method according to Claim 1, wherein the step of determining includes finding one unused IP address based on one known IP address.

5   13.   The method according to Claim 12, wherein, for the first network node being coupled to a subnet in the packet communications network, the step of finding includes:

calculating an IP address that is external from said subnet; and

contacting a node having the known IP address to determine whether the

10   node at the known IP address has knowledge of a subnet mask associated with said subnet.

14.   The method according to Claim 12, wherein the step of finding includes:

creating candidate subnet IP addresses; and

verifying at least one candidate subnet IP address is not in use.

15   15.   The method according to Claim 14, wherein the step of verifying includes:

contacting a node at a known IP address for each candidate subnet IP

address; and

monitoring network communication packets for deterministic network

address information.

20   16.   The method according to Claim 15 wherein deterministic network address information is parsed out of ARP requests.

17.   The method according to Claim 14, wherein the step of verifying includes correcting an IP conflict caused by verifying a candidate IP subnet address is not in use.

18.   The method according to Claim 12, further including the step of locating an IP address for at least one subnet router.

19.   The method according to Claim 18, wherein the step of locating includes, using the unused IP address, provoking some responses from the other subnet nodes.

20.   The method according to Claim 18, wherein the step of locating includes contacting the other network nodes at IP addresses from the collected network address assignment information for the purpose of identifying a router from among the other network nodes.

21.   The method according to Claim 20, wherein the step of contacting includes setting a router variable to elicit a known, router-specific response.

22.   The method according to Claim 1, wherein the step of determining includes isolating a subnet mask.

23.   The method according to Claim 22, wherein the step of isolating includes searching potential subnet masks in a binary search manner for the subnet mask boundary between ones and zeros.

24.   The method according to Claim 1, wherein the step of assigning includes performing a final check to ensure the unused network address is not in use.

25.   The method according to Claim 24, wherein the final check includes correcting an
IP conflict occurring during the final check.

26.   A method of retrieving a permanent network configuration by a first network
node, the method comprising the steps of:

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        determining an available local subnet configuration;

        accessing a second network node located outside the local subnet for a
permanent network configuration from a list of permanent network
configurations; and

        assigning the accessed permanent network configuration to the first

  10   network node.

27.   The method according to Claim 26 wherein the step of determining includes, by
the first network node:

        communicating with at least one other network node having local subnet
configuration information;

  15   determining the available local subnet address based on information
learned during said step of communicating; and

        assigning the available local subnet address to the first network node.

28.   The method according to Claim 26, wherein the step of determining includes
locating a local subnet router.

  20   29.   An interrogating network node capable of automatically assigning a network
configuration, comprising:

        an interface, coupled to a network including at least one other network
node;

a processor operating a processor routine, the processor being coupled to the interface to:

issue network packets to the interface; and

access responses in the form of plural inter-node communication

5   packets from the other network nodes to determine an available network

address to assign to the interrogating network node by analyzing collected

network address information contained in the plural collected inter-node

communication packets.

30.   The network node according to Claim 29, wherein the processor routine parses

10   responses from other network nodes to determine a subnet address of at least one

subnet router.

31.   The network node according to Claim 30, wherein the processor routine:

contacts a database via the subnet router; and

retrieves a permanent network configuration from the database.

15   32.   A system for automatically assigning a network address, comprising:

a first network node coupled to a network and having a list of unassigned

network configurations;

a second network node coupled to the network, the second network device:

determines an available network address by analyzing plural

20   network communication packets;

via the network, accesses the list in the first network node to

retrieve an available network configuration; and

assumes the retrieved network configuration.

33. The system according to Claim 32, wherein the second network node determines a network address of at least one subnet router through which contact to the first network node is provided.

34. An apparatus in a network node coupled to a network having one or more network

5   nodes , the apparatus comprising:

a storage means that stores a processor routine for determining a network configuration;

a processor loading the processor routine;

the processor being commanded by the processor routine to:

10   access the network;

determine an available network configuration by analyzing plural network communication packets; and

assume the available network configuration.

35. The apparatus according to Claim 34, wherein the processor communicates with

15   other network nodes.

36. The apparatus according to Claim 34, wherein the processor locates a router to access a second network node, the second network node providing a list of unassigned permanent network configurations.

37. The apparatus according to Claim 36, wherein the processor:

20   retrieves an unassigned permanent network configuration; and

stores the permanent network configuration to the storage means.

38. A processing device for automatically assigning a network configuration to a network node coupled to a network, the processing device comprising:

means for gathering network addresses; and

means for determining an available network address to assign to the network device by analyzing plural network communication packets.

39. The processing device according to Claim 38 further including a means for determining a network address of at least one network router.

40. The means according the Claim 38, wherein the means for determining includes a means for accessing a list of available network configurations.

41. A method for causing nodes on a network to correct an entry for a node in address tables, the method comprising the steps of:

using an unused address on the network, preparing a request to the node for which the entry is to be corrected; and

forwarding the request to the node to cause a responsive request from the node, the responsive request causing the network nodes to correct the address tables of the network nodes to include an address for the node which is identified in the responsive request from the node.

42. The method according to Claim 41 wherein the unused address is determined based on the address of the node for which the entry is to be corrected.

43. The method according to Claim 41 wherein a plurality of requests are issued to the node from addresses possibly unused.

44. The method according to Claim 41 wherein the request is an ICMP packet.

45. The method according to Claim 41 further including the step of determining whether the node for which the entry is to be corrected responsively issued a message that is expected to correct the entry for the node in address tables.

46. The method according to Claim 45 wherein the message responsively issued is an
5   ARP request.

47. The method according to Claim 45 further including, if the node for which the entries are to be corrected does not provide a response to correct the entries, issuing a network packet for the node that will correct the entries.

48. The method according to Claim 47 wherein the message is an ARP request.

10 49. A network node causing nodes on a network to correct an entry for a node in address tables, comprising:

    an interface coupled to a network including at least one other network node;

    a processor operating a processor routine, the processor being coupled to
15 the interface to:

        prepare a network packet to send to the node for which the entry is to be corrected;

        issue network packets to the interface while posing as a node at an unused address on the network; and

20   forward the network packet to the node to cause a responsive request from the node, the responsive request causing the network nodes to correct the address tables of the network nodes to include an address for the node identified in the responsive request from the node.

50. The network node according to Claim 49 wherein the unused address is determined based on the address of the node for which the entry is to be corrected.

51. The network node according to Claim 49 wherein the network packet is an ICMP packet.

5   52. The network node according to Claim 49 wherein the processor further determines whether the node for which the entry is to be corrected responsively issued a message that is expected to correct the entry for the node in the address tables.

53. The network node according to Claim 52 wherein the message responsively
10 issued is an ARP request.

54. The network node according to Claim 49 further including, if the node for which entries are to be corrected does not provide a response to correct the entries, issuing a network packet for the node that will correct the entries.

55. The network node according to Claim 54 wherein the network packet expected to
15 correct the entries is an ARP request.

56. A computer program product comprising:
        a computer usable medium for storing data;
        a set of computer program instructions embodied on the computer usable medium, including instructions to:
20   determine an unused address on a network;
            prepare a request to a node for which an entry in address tables is to be corrected; and

using the unused address, forward the request to the node to cause a responsive request from the node, the responsive request causing the network nodes to correct the address tables of the network nodes to include for the node an address identified in the responsive request from the node.

5   57.   The computer program product of Claim 56 wherein the instructions further include instructions to determine whether the node for which the entry is to be corrected responsively issued a message that is expected to correct the entry for the node in the address tables.

        58.   The computer program product of Claim 57 wherein the instructions further
10   include instructions to issue a network packet posing as the node for which entries in address tables are to be corrected.

        59.   A processing device for causing nodes on a network to correct an entry for a node in address tables, the processing device comprising:

                means for using an unused address on a network;

15   means for preparing a request to the node for which the entry is to be corrected; and

                means for forwarding the request to the node to cause a responsive request from the node, the responsive request causing the network nodes to correct the address tables of the network nodes to include for the node an address identified
20   in the responsive request from the node.

        60.   The processing device of Claim 59 further including means for determining whether the node responded in a manner expected to correct the entry in the address tables.

61. The processing device of Claim 60 further including means for issuing a packet while posing as the node for which entries in address tables are to be corrected.

62. The processing device of Claim 61 wherein the packet is an ARP packet.

63   A method for automatically determining a subnet mask by a first network node attached to a subnet in a packet communication network, the method comprising the steps of:

      issuing plural communication packets from plural source addresses to at least one address known to be used in the subnet to evoke responses; and

      based on the presence or absence of responses from the network nodes at the known addresses, determining the subnet mask which represents the subnet.

64. The method according to Claim 63 further including the step of identifying plural source addresses just inside and outside a possible subnet mask.

65. The method according to Claim 64 wherein plural source addresses are randomly selected.

66. The method according to Claim 64 further including the step of forwarding a message to a known address on the subnet, from the source addresses.

67. The method according to Claim 66 wherein the message is an ICMP request.

68. The method according to Claim 66 wherein the step of determining is based on whether a response is received from the known address.

69. The method according to Claim 64 wherein the step of determining includes determining whether a node having the same address as the source address has been observed issuing other subnet communications.

70. The method according to Claim 63 wherein the steps of issuing and determining are repeated until a response is received from just within a possible subnet mask and not from just outside the possible subnet mask.

71. The method according to Claim 63 wherein the steps of issuing and determining are repeated until exhausting possible subnet masks.

72. The method according to Claim 71 wherein an appropriate search method is applied to exhaust possible subnet masks.

73. The method according to Claim 72 wherein the search method is a binary search.

74. A network node attached to a subnet capable of automatically determining a subnet mask in a packet communication network, comprising:

an interface coupled to a subnet including at least one other network node; and

a processor operating a processor routine, the processor being coupled to the interface to:

issue plural communication packets from plural source addresses to at least one address known to be used in the subnet to evoke responses; and

based on the presence or absence of responses from the network node at the known address, determine the subnet mask which represents the subnet.

75. The network node according to Claim 74 wherein the processor further identifies plural source addresses just inside and outside a possible subnet mask.

76. The network node according to Claim 75 wherein the processor further forwards a message to a known address on the subnet, from the source addresses.

77. The network node according to Claim 74 wherein the processor repeats the issuing and determining steps until a response is received from just within a possible subnet mask and not from just outside the possible subnet mask.

78. The network node according to Claim 77 wherein repeating the issuing and determining steps is performed in a binary search manner.

79. An apparatus in a network node coupled to a network having one or more network nodes, the apparatus comprising:

a storage means that stores a processor routine for determining a network configuration; and

a processor loading the processor routine;

the processor being commanded by the processor routine to:

issue plural communication packets from plural source addresses to at least one address known to be used in the subnet to evoke responses; and

based on the presence or absence of responses from the network node at the known address, determine the subnet mask which represents the subnet.

80. The apparatus according to Claim 79 wherein the processor routine further

5   identifies a source address at the edge of the possible subnet masks.

81. The apparatus according to Claim 80, wherein the processor routine further forwards a message to a known address on the subnet, from the source address.

82. The apparatus according to Claim 79, wherein the processor routine repeats the issuing and determining subnet masks based on the responses from other network

10   nodes until a response is received from just within a possible subnet mask and not from just outside the possible subnet mask.

83. The apparatus according to Claim 82 wherein repeating the issuing and determining steps is performed in a binary search manner.

84. A processing device attached to a subnet in a packet communication network for

15   determining a subnet mask, the processing device comprising:

        means for providing possible subnet masks;

        means for issuing at least one communication packet to the subnets defined by the respective subnet masks;

        means for collecting responses from other network nodes on the subnet;

20   and

        means for determining whether one of the subnet masks represents the subnet.

85. The processing device of Claim 84 wherein the means for issuing, collecting, and determining continue to work until a response is received from just within a possible subnet mask and not from just outside the possible subnet mask.